Director Charles Groat Remarks at the National River Rally 2005, Keystone, Colorado, May 23, 2005

Intro and USGS role

- Water is plentiful in many areas of our Nation but it needs to be used wisely to meet the demands of domestic, agricultural, commercial, industrial, recreational, and ecological uses.
- Competing demands are making water-management decisions increasingly complex.
- 125 years of reliable, impartial science used to understand the nation's water resources.
- Monitor water quantity and quality in aquifers and rivers
- Provide data and scientific analyses to support water-management decisions
- Work in cooperation with State, local, and other Federal agencies
- The health and availability of our nation's water resources depends upon best science practices, improved understanding of the resources, and informed decisions by everyone---from national leaders, to state and local decision-makers, to individual citizens drinking and using water every day.

Water Quantity / Water Use

- Does the United States have enough water? The simple answer - we don't know.
- Planning for water depends on understanding the Nation's water resources and how people will use water in the future
- A recent USGS study, *Estimated Use of Water, 2000*, looked at total water withdrawals from the rivers, streams, lakes, estuaries, and groundwater.

- Results show that Americans use about 408 billion gallons of water per day.
- That amt. would fill the Empire State Building 1,470 times per day, fill 8 billion bath tubs per day and equals 1,430 gallons per person, per day
- Primary uses of water are:

    48 % electric power generation

    11% public water supply

    34% irrigation

    7 % livestock, mining, aquaculture and domestic wells
- Trends from the water use report show that:

    Despite growing population, water use has been stable since 1985

    This is a sign that conservation measures are working

    Personal use of water is rising, but not faster than population change.

    Advances in technology in irrigation and power generation have allowed us to do more with less water

- For more than 50 years, USGS has compiled water-use information in cooperation with al of the states and many other federal agencies and organizations.

- Studying trends in water use shows which regulations and initiatives are working and which have room for improvement.

USGS Water Quality Studies

- Requirements for safe drinking water and requirements to maintain healthy ecosystems are leading policy makers to ask complex social and scientific questions about how to assess and manage our water resources.

- We (NAWQA) recently completed a long-term study of water quality in major river basins and aquifers across the Nation.

- Looked at pesticides in water, sediment, and fish; volatile organic compounds in major aquifers used for domestice and public supply; nutrients and trace elements in streams and ground water, and aquatic ecology.

- In general, the report found the Nation's waters are suitable for irrigation, drinking-water supply, and other home and recreational uses.

- But major challenges continue to affect streams and ground water: point and nonpoint sources of pesticides, nutrients, metals, gasoline-related compounds, and other contaminants.

- These assessments use a nationally consistent design and methodology so that water-resource managers can compare water quality in their basins to other areas in the Nation.

- Assessments also delineate the effects of natural factors and human activities on water resources, such as effects associated with agriculture and urban development.

- Contaminant levels vary from season to season and among watersheds because of differences in land and chemical use, land-management practices, degree of watershed development, and natural features, such as soils, geology, hydrology, and climate.

- Using this information, decision makers can implement cost-effective water-management strategies in specific geographic areas.

Pharmaceuticals, Hormones, and Other Organic Chemicals

- Chemicals used everyday can be released to the environment through discharges from industrial facilities, animal feed lots, wastewater treatment plants, individual septic disposal systems or through runoff from land applications in agricultural and urban areas.

  - Human health and environmental effects of wastewater chemicals are not well understood, and standards to protect human health or aquatic life have not been established for most of these chemicals.

- Until recently, there have been few analytical methods capable of detecting chemicals at the low concentrations found in the environment.

- National Water-Quality Laboratory in Denver specializes in environmental analytical chemistry, and features standardized laboratory methods and quality-assurance and quality-control protocols.

- New lab methods were developed about 5 years ago that now provide the ability to measure the concentrations of 95 waste-water related chemicals.

- Can detect concentrations at very low levels— commonly 10 to 1,000 times lower than the EPA standards and guidelines. These sensitive methods allow for an early detection of potentially harmful contaminants before they reach levels of concern

- Methods were developed to measure these particular chemicals because they are expected to enter the environment through common wastewater pathways, are used in significant quantities, may have human or environmental health implications, and can be accurately measured in environmental samples by using available technologies.

Streamgage Program (At Keystone resort, there is a 57-yr old cableway gage on the Snake River. Visible from the main plaza area where you buy ski lift tickets.)

- Since the late 1800's, the USGS has operated a streamgaging program to collect information about the nation's water resources, in particularly the flow of rivers.
- Currently, there are about 7,400 streamgages nationwide.
- Streamflow information is used for purposes such as:

  Water resource appraisal and allocation

  Infrastructure design - bridges and water treatment plants

  Flood hazard planning

  National Weather Service flood forecasting

  Reservoir operations

  Water-quality management

Habitat assessment and protection

Recreational enjoyment and safety

Understanding changes in streamflow due to land-use and climate changes.

- 90 percent of streamgages are operated by the USGS in cooperation with other Federal, State, and local agencies. About half are funded through cost-sharing arrangements where the USGS provides 50% of funds and state and local cooperating agencies provide the other half.

- There is good news and bad news in this funding arrangement. "Good news" is there are about 800 funding partners; "bad news" is there are about 800 funding partners!

- Streamflow data are available to **all** potential users through USGS data bases, on the Internet, and through USGS publications.

Value of Long-term data

- USGS has been collecting data for more than a century at some of its monitoring stations.

- Long-term collection creates a set of baseline data to assess the significance of observed changes.

- Helps answer questions like:

  • How high will streams rise if my area experiences a 100-year flood?

  • Did implementation of stream buffers and other restoration practices work?

  • Are streamflows in this watershed at historically low or high levels?

- Understanding streamflow trends is essential to effective management of the nation's water supply and is critical to developing strategies that mitigate the potential negative impacts of floods and droughts.

Recent trends (series of 4 new fact sheets are available at USGS booth)

- Recently concluded there is a nationwide trend toward increasing streamflow in many areas of the nation since 1940 based on data from long-term monitoring. Most of the increases were during low-and-moderate streamflows. This means that, during typically dry periods, more water is now available in the stream.

- Discovered that over the last 30 years, winter/spring streamflows occurred one to two weeks earlier than in previous decades in northern or mountainous areas of New England.

- Scientists found that streamflows in most western rivers occur almost one to three weeks earlier now than they did in the middle of the 20th century.

- Streamflow of the Mississippi River was influenced by both climate and human activities such as construction of water reservoirs, agricultural irrigation and groundwater pumping. Streamflow of the Mississippi River increased at a rate of 4.5 percent per decade largely because of an increase in precipitation.

Citizen Monitoring

-USGS works with citizen monitors in many watersheds across the Nation. - Informed citizens of a watershed often are in the best position to identify priority water issues

and to understand the political, social, and economic context in which those issues are addressed.

- Citizen monitoring enhances the monitoring conducted by USGS and other federal and state agencies by filling in geographic gaps or by increasing the frequency of sampling.

- Information collected by citizen monitors can also help USGS and other water-resource agencies know where to focus their broader data-collection activities and analysis.

Successful partnerships with watershed groups

Colorado- Big Thompson Watershed Forum

Background:

Until 1999, water quality monitoring in the watershed was performed by many state, local, and federal agencies with no coordination among programs and with few efforts toward efficiency, data comparability, or information exchange. A study was done that recommended the establishment of a collaborative watershed management effort to address the need for scientifically sound studies to assess and protect the quality of water in the Big Thompson Watershed. Since then, the forum has been pursuing the design and implementation of a cooperative water quality monitoring program. The program design involved consensus building among the funding participants, primarily drinking water providers. The final monitoring design included 38 parameters to be sampled 15 times per year at 24 stream locations plus 2 reservoirs.

What the USGS is doing:

- To ensure standardization, all field samples are collected by USGS or trained volunteers.
- Standard sampling protocols are used, including depth integrated and width integrated composite sampling.
- National Water Quality Lab in Denver is performing the nutrient and trace element analysis because it is capable of analyzing nitrogen and phosphorous at very low levels.
- This is an excellent example of a cooperative venture that shows the value of voluntary exchange of information in order to identify and address water quality concerns in a proactive manner.

Connecticut - Pomperaug River Watershed Coalition

Background:

In recent years, increased use of surface and ground-water supplies has created concern that insufficient flows remain for future development, aquatic habitat, and recreational use. In response, the Pomperaug River Watershed Coalition (PRWC) was formed in 1999, and stakeholders within the watershed identified a vital need to determine the amount of water available for future allocation while protecting the ecological integrity of the watershed. Because of the uncertainties in the quantity of water available for future use, new applications for water diversion cannot be addressed with much understanding of the effects on instream flows or ecological system.

What USGS is doing:

- has developed a comprehensive hydrologic model of the Pomperaug River Watershed.

- will provide the tools needed for the PWRC to manage the watershed to achieve their goals and objectives.

Program Objectives:

1) Plan, build, calibrate, and verify a hydrologic model of the watershed for the purpose of water-resources planning and management.

2) Simulate the hydrologic-system response to different land use, water use, and climatic conditions, and provide water-quantity information required for the water-allocation and instream flow assessments,

3) Quantify the water availability in the Pomperaug Watershed including assessments of both the naturally occurring surface-and ground-water resources and an analysis of the past, current, and possible future cumulative effects of multiple water uses, land-use changes, and climate changes on the available water supply, and

4) Quantify the available surface-and ground-water resources for different combinations of land use, water use, and climatic conditions.

AZ - Upper San Pedro Partnership

Background:

The Upper San Pedro Partnership is a group of 21 agencies and private organizations that are working together to meet the water needs of the people of the area (southeastern tip of AZ) while protecting the San Pedro River Riparian National Conservation Area. The partnership is dedicated to meeting the long-term groundwater needs of area residents and the San Pedro River. Without an adequate long-term water supply, neither the people of the area nor the river will thrive. Together, these governmental agencies

and private organizations are making progress. Congress recognized the importance of preserving both Fort Huachuca and the San Pedro River in the National Defense Authorization Act for 2004--Section 321. The bill recognizes the importance of "cooperative water use management" and gives permanent congressional recognition to the Partnership and its continuing efforts to eliminate deficit groundwater pumping by 2011. The legislation also requires that the Secretary of the Interior, in consultation with the Secretary of Agriculture, the Secretary of Defense and the Upper San Pedro Partnership, prepare a report on local water mitigation efforts. Also, annual progress reports are required and funding for future projects will take into account whether the Partnership has met its goals. Technical experts for the partnership include scientists from USGS, USDA Agricultural Research Service, the AZ Dept. of Water Resources, the BOR, The Nature Conservancy and BLM, among others. When needed the Partnership also contracts for additional expertise through universities and private consultants.

What USGS is doing:

- team of USGS scientists is conducting hydro geologic studies in the upper San Pedro basin to provide the scientific knowledge needed to ensure that water-resource plans are conducive to the sustainability of the resource
- USGS has established over 200 monitoring locations throughout the watershed to measure water table levels and stream flows.
- Some monitoring stations have data going back as far as the mid 1900's. Connecting historical records newer data helps analyze trends and describe how the groundwater system works in relation to the river.

- USGS report to Congress will be released soon

More partnering and volunteer examples:

Massachusetts:

-USGS has for years worked with the Charles River Watershed Association in Boston to help monitor and publicize water quality and flow in the recreational portion of the lower Charles. Now we are doing a new RNA fingerprinting method to trace the source of bacteria that end up in the river.

- On the Blackstone River, (flows from MA into RI and Narragansett Bay) there are issues of sediment, nutrients, and contaminants in fish (PCB's). USGS is likely to be a signatory to a compact that the Governors of the 2 states are signing on June 16. USGS has already done 2 models of the river, and will be doing other studies and monitoring to help the effort. The whole effort is in concert with national NGO's such as the Audubon Society and American Whitewater Association, and also with some local watershed groups.

- Volunteers affiliated with the Sudbury River Watershed Organization collect stage and depth data on the Concord and Sudbury Rivers for a water-quality model we are developing.

- We do some monitoring and modeling in cooperation with government agencies and local watershed groups for the Ipswich River, which goes dry in the summer from ground-water pumping.

D.C. Metro area:

- Potomac River Access Foundation, a group of white-water paddling enthusiasts mounted a campaign to raise funds to "Save the Gage" so the Little Falls streamgage on

the Potomac River wouldn't be shut down. This section of the river has one of the best stretches of white-water in the DC metro area. The NPS relies heavily on the gage for river warnings.

USGS water info on the web

- Because each of you is intricately involved in water resources and concerned about your particular watershed, I want to share with you some ways to access information about USGS water investigations.

- USGS water science centers are in nearly every state

- NWIS-Web contains hydrologic information collected by the USGS for the past 125 years. It brings data to your desktop -

Streamflow data from 21,000 sites

Water levels from over 1 million wells

Chemical data from 338,000 sites

Streamgaging data from more than 7000 sites

More than 4 million water quality samples

All data is available to the public and accessible on the USGS website.

Stop by the USGS booth and someone will show you how to access the data

Conclusion:

- Managing water resources requires an understanding of the entire hydrologic system.

- Hydrologic systems cross jurisdictional and political boundaries.

- Only when the water resource is understood in an integrated manner is it possible to manage it in a way that will provide sound, sustainable solutions.

- Nationwide, water supplies are under stress.

- Over allocated, competitive demands for water such as agriculture, recreation, endangered species habitat, Native American tribal rights, and environmental concerns are driving major conflicts and underscore the heightened need for credible timely data.
- Society and public policy must strike a balance between these competing demands.
- We cannot afford to waste any of our nation's water resources to uninformed decisions. -- Decisions must be based on best available science.
- Science holds the answers. Need to make science work for society
- Scientists, managers, and end users need to partner, collaborate and communicate effectively in order to apply scientific analyses to management decisions that will ensure safe and reliable sources of water resources into the future.
- Collaboration with partnering organizations and agencies is the key.
- By working together to address water issues locally, nationally and globally, we can understand and track the way water shapes our world.